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(FOUO 13/79)

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TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

(FOUO 13/79)

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WORLDWIDE REPORT

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WORLDWIDE AFFAIRS

COMMENTS ON AFRICAN CLAIMS TO BE SUBMITTED TO WARC IN GENEVA

Paris JEUNE AFRIQUE in French 26 Sep 79 p 71 LD

[A. A. commentary: "Africa's Voices"]

[Text] Many African and Arab countries are aware that they would not gain anything by turning the Geneva [World Administrative Radio Conference] conference into a court of accusation. At the preparatory regional meeting in Nairobi (Kenya) in February 1979 they prepared the technical arguments with which they will support their demands especially in the field of radio and television.

Their first concern is to protect and develop national broadcasting. Almost all broadcasts in Africa are made by using so-called decametric waves better known under the names long and medium waves. These bands have many users: in addition to most international broadcasts they are used by maritime and aeronautical radio users, post offices, meteorological services and so forth, which means great congestion. Although African stations have only these bands for their communications, the industrialized countries will be able to do without them once they have launched all their radio communications satellites. Therefore at Geneva Africa will ask either for the extension of these bands to reduce interference or for the great powers simply to withdraw from them.

Furthermore, within these bands certain transmitters are much more powerful than others, and Africa is at a disadvantage here. This imbalance encourages intentional or unintentional interference. Therefore the developing countries are calling into question the authorized transmitter power limits. In this way, especially if they persuade the conference to reserve decametric wavelengths exclusively for broadcasting, African broadcasts will finally be able to be heard clearly throughout national territories and perhaps even in other countries.

Furthermore, Africa uses short and very short wavelengths for stationary services (post office, meteorological service...) and for mobile services (aviation, maritime navigation, radio cars...). The bands which have been allotted [attribuer] to Africa are now proving inadequate.

Furthermore, account should be taken of new technologies. A new band known as the single lateral band in the decametric wavelength bands will soon be in use. Of course it offers considerable advantages since it enables a larger number of stations to function on the same range of waves. However, this new technology requires the complete replacement of all the receivers now in service and, hence, considerable expenditure which most Third World countries cannot afford. They want their access to the single lateral band to be reserved even if they do not yet have the means to use it.

The same demand is being made for access to the famous 1 gigahertz centimetric band which enables sound broadcasting direct by satellite.

In a less technical field the Nairobi seminar participants criticized the world's division into three telecommunications regions (America, Europe and Africa-Asia). This division dates from the Atlantic City (United States) conference in 1947 [date as published] and is not suited to present needs.

Finally, also in the name of equal rights, the African countries want to reserve access to "orbital parking places" for their future direct radio communication and radio-television satellites.

Africa thinks its demands are reasonable. Will it manage to convince its interlocutors?

CSO: 5500

BRIEFS

'NOVOSTI-ASAHI SHIMBUN' AGREEMENT--The executives of the NOVOSTI Soviet News Agency and the ASAHI SHIMBUN agreed on Friday to continue efforts to deepen their ties by promoting exchanges of news and by jointly sponsoring cultural events. The agreement was reached at a meeting held at the ASAHI SHIMBUN's Tokyo office during a courtesy call paid by a NOVOSTI delegation, including President L. N. Tolkunov. The ASAHI SHIMBUN was represented by Chairman Tomod Hirooka, President Seiki Watanabe and Managing Director Shoryu Hata. President Mitsugu Nakamura of the ASAHI EVENING NEWS was also present at the meeting. Watanabe stressed the important role the press can have in furthering Japanese-Soviet relations. Tolkunov said the press was required to exert their best efforts when bilateral relations were in a delicate situation and emphasized the importance of deepening mutual understanding. [Text] [Tokyo ASAHI EVENING NEWS in English 29 Oct 79 p 3 OW]

CSO: 5500

JAPAN

FUJITSU GEARING UP FOR U.S. EXPORTS

Tokyo MAINICHI DAILY NEWS in English 21 Sep 79 p 5

[Text] The leading Japanese computer manufacturer Fujitsu Ltd announced Wednesday that it has started preparations for exporting its own computer systems and computer peripherals under its own brandname "FACOM" to the United States for the first time by embarking upon a feasibility study with American conglomerate TRW, Inc on the assumption of eventual formation of a joint sales venture there.

Fujitsu said the feasibility study got under way this month to last about six months and will cover marketing research on the U.S. market and business plans for a possible tie-up. The products under consideration are all the Fujitsu computer systems and related equipment except for Fujitsu's high-end computer systems produced for Amdhal Corp and magnetic tape equipment produced for Memorex.

The Japanese computer maker said that the feasibility study does not bind the two companies to form a joint sales venture.

However, it continued, if the study proves to be successful, the joint venture will be established next March and will become operational in around September next year. And the size of the joint venture will be decided by the end of this year, it added. In that event, it said Fujitsu will take the majority equity and controlling power in the sales venture.

Fujitsu has long been wanting to get into the world's largest computer market under its own brandname, although it has been selling computers and peripherals under the brandname of Amdhal and Memorex.

The Amdhal computers manufactured by Fujitsu are usually called plug compatible machines to the IBM computers because these PCMs can be used in place of IBM machines at lower prices.

However, IBM started to market new computers (Series E) whose software (operating system essential to run computers) are different from previous models and will not leave much room for PCMs manipulation, making

it very hard for IBM compatible computer makers to make money by selling lower-priced machines.

On top, two other Japanese computer makers Nippon Electric Co (NEC) and Mitsubishi Electric (Melcom) have began to export their computers under their own brandnames. Another major Japanese computer maker Hitachi is also wanting to advance into the U.S. market under its own brandname.

Fujitsu said it did not choose to advance into the U.S. market alone because it would entail too large of an expenditure to set up its own sales, maintenance, and software networks across the continent and too long a time to gain much needed know-how in doing computer business in the U.S.

So it is going to tie-up with America's 11th ranking computer business TRW because it is willing to give the controlling power to Fujitsu and accept the FACOM brandname in the event of tie-up.

Fujitsu said, if the joint venture is established, it will enter the U.S. market with POS and financial computer terminals for sales to TRW's customer base which includes such giant retailers as Sears, Roebuck and Co and May Co.

Fujitsu added that it will not sell its high-end computers (M-series) through the possible joint sales venture in the U.S. even after the proposed merger between Amdhal and Memorex materializes.

CSO: 5500

BRIEFS

JOSEPHSON MEMORY--Musashino Electrical Communications Laboratory of Nippon Telegraph and Telephone has developed a non-destructive readout Josephson memory element. The Musashino ECL last year developed a Josephson high performance logic element with a delay time of 150 picosecond and power consumption of 6 microwatts per gate. /Summary/ /Tokyo KIKKAN KOGYO SHIMBUN in Japanese 4 Oct 79 p 14/

NEC U.S. DEALERSHIPS--Nippon Electric's U.S. subsidiary NEC Information Systems has contracted with 12 U.S. firms on the East Coast including Frontier Management (Boston), DDPS (New York), and Math Box (Washington) to act as dealers for NEC office computers and printers. NEC's sales targets for JFY 1980 include 300 office computers and 10,000 spinwriters (printers) to be exported to the United States. NEC plans to expand its dealership network to the West Coast and in 2 years have nearly 30 U.S. firms in its dealership network. /Summary/ /Tokyo NIKKAN KOGYO SHIMBUN in Japanese 2 Oct 79 p 13/

FIBER OPTICS LASER--Three Japanese research groups have almost simultaneously succeeded in developing 1.5-1.6 micron wavelength semiconductor lasers capable of continuous operation at room temperature. The lasers have an InGaAsP active layer, just as used for the 1.3 micron band but modified by changing the (x, y) ratios of $In_{1-x}Ga_xAs_{1-x}P_y$, and prevention of melt-back of the InP cladding layer on the InGaAsP active layer is accomplished by adding a thin InGaAsP anti-melt-back layer atop the active layer or by crystal growth at 592°C instead of the usual 630°C. The new lasers, developed by KDD's R&D Lab, Tokyo Institute of Technology, and NTT's Musashino Electrical Communications Laboratory, enable using the optimum wavelength for optical fiber (1.55 micron, loss 0.2 dB/km) and are promising light sources for long-range transmissions of up to 100 km without a repeater. [Tokyo NIKKEI ELECTRONICS in Japanese 1 Oct 79 p 56]

LOW LOSS OPTICAL FIBER--Ibaraki Electrical Communications Lab of NTT has test manufactured a low-loss optical fiber with propagation loss 0.5 dB/km at 1.3 micron wavelength and 0.28 dB/km at 1.6 micron by using the vapor axial deposition (VAD) method. In contrast to the MCVD method, a thick, long preform can be continuously produced, a major factor in mass producibility, and cost reduction by an order of magnitude may be possible. The results cited above were obtained with an optical fiber with a core of SiO_2-GeO_2-P_2O_5 and cladding of SiO_2-P_2O_5. [Tokyo NIKKEI ELECTRONICS in Japanese 1 Oct 79 p 77]

ANTI-IBM ALIGNMENTS FORMING--It appears that an international realignment of the computer industry may be about to break out. Fujitsu has tied-up with TRW, Hitachi, burdened with problems with Itel, seems to be trying to formulate counter measures, and NEC and Mitsubishi Electric are both in the "pre-negotiation stage" with foreign concerns. Mitsubishi Electric is reported moving ahead toward a possible tie-up with a group of plug-compatible manufacturers including Magnuson and Consultant Corp. NEC is facing negotiations with Honeywell and has presented specifications on its ACOS machines to Nixdorf Computer, the number two (to Siemens, which has a tie-up with Fujitsu) computer company in West Germany. The source of this information [who appears to be associated with Mitsubishi Electric] considers Japan-foreign computer company tie-ups to be a major proposition for survival in the 1980's computer war. [Tokyo NIKKAN KOGYO SHIMBUN in Japanese 21 Sep 79 p 12]

FUJITSU SUPERCOMPUTER--Fujitsu has announced the development of a "vector processor" supercomputer capable of handling scientific calculations for atomic energy and space applications. The machine, capable of parallel processing of multivariant numerical data, will be 10 times as fast as current M-200 and M-200H general purpose computers, and a model under development will be 50 times as fast. Fujitsu plans to commercialize the "vector processor" during the coming year. [Tokyo NIKKAN KOGYO SHIMBUN in Japanese 27 Sep 79 p 1]

FUJTISU-TRW TIE-UP--Fujitsu's tie-up with TRW not only gives it entry into the U.S. computer market under its own brand name, a step in its strategy of encircling IBM, but is expected to allow Fujitsu to utilize TRW's space electronics, satellite, and other technology and know-how in its efforts to enter the defense industry arena. [Tokyo NIKKAN KOGYO SHIMBUN in Japanese 20 Sep 79 p 12]

OPTICAL FIBER UNDERSEA CABLE--The Optical Fiber Cable Technology Joint Research Committee Seabed Cable Subcommittee (members Nippon Telegraph and Telephone Public Corp, Furukawa Electric, Sumitomo Electric Industries, Fujikura Cable Works, and Ocean Cable) started research on undersea optical fiber cable in spring 1978 and has now completed three prototype cables

eash about 1 km in length and tested them at NTT's Ibaraki Electrical Communications Lab. Fiber pressure tolerance and many other technical problems remain, but use for short distances and shallow seas may be possible within a few years. Phase 2, which has started, is aimed at a prototype cable with relays for long distances that can withstand pressures at 10,000-meter depth, and test manufacture of this cable may be completed as early as during November. [Tokyo NIHON KOGYO SHIMBUN in Japanese 17 Sep 79 p 1]

CSO: 5500

SAUDI ARABIA

BRIEFS

ARAB COMMUNICATIONS SATELLITES--ASCO, the Arab Communications Satellite Consortium, is preparing to make a deposit of $100,000 payable to the Arianespace Company to have the Ariane rocket launch the first two Arab communications satellites, called Arabsat. [Excerpt] [Paris VALEURS ACTUELLES in French 8 Oct 79 p 74]

CSO: 5500

IVORY COAST

IVORIAN TELECOMMUNICATIONS MINISTER INTERVIEWED

Paris JEUNE AFRIQUE in French 26 Sep 79 pp 4-7

[Text] [Question] Is it true, sir, that the Ministry of Posts and Telecommunications is leaning towards a management like that of a business enterprise and is drawing away from the classic administrative standard model? What is the ministry's role now that its functions are being carried out by companies?

[Answer] It is true that specific nature of the industrial and commercial sector of posts and telecommunications has led the government to confer upon them the status of a public agency of the state corresponding to that specific character. The Ministry of Posts and Telecommunications is a supervisory ministry which in particular controls the office of posts and telecommunications, an establishment of the state, INTELCI [International Telecommunications of the Ivory Coast], a state firm.

These various bodies are being increasingly run on the basis of their objectives, action programs and management control, just like any business concern worthy of that name. At the end of the fiscal year, accounts and balance sheets make it possible to sanction the management of the various sectors.

[Question] Your over-all plan now being carried out covers the period from 1976 to 1980. It is an ambitious one. Will its goals be reached?

[Answer] Our strict control over management makes it possible to become aware of the gaps between planning and realization. So it is easy to answer your question. At the end of the 1978 fiscal year we established a diagnostic balance sheet of the 1976-1980 plan, which has been brought up to date and finally set at 70 billion CFA [African Financial Community (monetary unit)] francs. For the postal system, its situation is as follows. At the end of 1980 the construction work on the national postal sorting center and ten new offices will have been completed. In this way the building of 49 offices making up the postal program, within a period of 5 years will have been 90 percent at the end of 1978 with respect to Abidjan. In contrast, with respect to the country's interior, major delays run the risk of occurring. They are mainly attributable to the building firms' construction difficulties.

Where international telecommunications are concerned, the center for the automatic transmission of messages, the laying of the Abidjan-Lagos cable for the Akakro station's second transmitter will achieve nearly 100 percent realization for us in this sector.

As for the regular services, construction of the building for the Post and Telecommunications Office's central services, the first segment of the PTT's Yamoussoukro complex and construction of the Bouake telephone exchange will get well under way during that period.

[Question] In Abidjan as in other capitals people are talking about the telephone crisis. Is the end of that crisis in sight?

[Answer] To resolve that crisis, significant action has already been undertaken by the government. It is aimed at greatly increasing the telephone network as well as developing and especially modernizing the network. The total investments devoted to that sector come to about 62 billion CFA francs, that is, for the 1976-1980 period 10 times what was achieved from 1960 to 1975. The country's telephone service [crisis] is well on the way to being resolved.

[Question] What is the status of the Africa-South America cable-laying.

[Answer] The relevant construction agreement has just been signed and the calling for bids will certainly be made at the end of the year. Putting it into service will take place during the first quarter of 1982.

[Question] How are the cadres and higher-level technicians in the Ivory Coast's PTT sphere trained?

In Abidjan, there is a National Advanced Training School for Posts and Telecommunications established by Decree 67,525 of 2 May 1967. It opened its doors in 1975. It trains engineers in telecommunications technology. On the other hand, a center for practical professional training turns out high-level post and telecommunications technicians and practical technical workers. An advanced multinational training school develops postal inspectors and administrators.

[Question] How can the Ivory Coast and, in a more general way, Africa, get involved in telecommunication programs with very limited means without being immediately outstripped by technological progress?

[Answer] The field of telecommunications is actually a vital sector which experiences developments every 10 years. When it was decided to undertake, as we are doing, network development and modernization programs, it was evident that it was necessary to take that technological devlopment into consideration in the sphere of communications as in that of switch overs.

In transmissions, for example, outside of the analogical wireless beams, more and more is being said about numerical wireless beams, laser beams, cable lines, domestic satellites, etc. As to switch overs, our options concern electronic space and time telephone exchanges.

Our choices take into account both our needs, our means and our determination to master the development of the network on our own.

That leads us to make the careful but bold choices that should avoid for us all the stages of network development vehicle the large European and American countries have gone through.

In the transmitting sphere, the choice has been made for the analogical wireless beam for the purpose of equipping the major communication lines with 300 to 2,700 telephone circuits. Regional and departmental lines will be equipped with numerical wireless beams of 30 to 120 telephone circuits.

[Question] What lessons are to be derived from PANAFTEL [Pan-African Telecommunications Network]?

[Answer] The lessons from it can be summed up briefly if one refers to the conclusions of the work done on the general telecommunications plan for Africa [at the conference] held in Abidjan in March 1979 under the aegis of the International Telecommunications Union. The means for satellite, underwater cable, wireless beam transmitting are to be taken jointly into account so as to make them complementary to each other.

[Question] What are the prospects where telecomputer and telecommunication matters are concerned for the 1981-1985 plan? And in the year 2000?

[Answer] In the field of telecommunications where the next plan that we are in the process of drawing up is concerned, the outlook is very promising. Our draft planning leads us to envisage that between 1985 and 1990 the Ivory Coast'e telephone network should increase from 75,000 to 120,000 or 150,000 telephone lines. The electronic exchanges of a time type will probably be highly developed and will replace the electromechanical exchanges. The transmitting of telematic data will develop enormously.

With respect to prospects for the year 2,000 and assuming particularly that the immediate objectives, which preoccupy us far more, are attained, it is possible to assert that telecommunications will take on a new look that will probably be one of computers, satellites, transistors and microcircuits. So it will be possible to have visiophonic terminal equipment available for the homes of subscribers, teaching through computers will be feasible, the radio telephone will make it possible for subscribers to make calls while traveling short or moderate distances. We will be able to be in touch with the computers by means of telephones with keyboards so as to make inventories, do accounting or keep stock records.

The long distance automatic telephone will certainly have spread throughout the world as a whole thanks to the development of satellites, underwater cables and overland systems. Finally, the development of the electronic switch will make possible communication, tone and reduced automatic selection transfers.

According to those who make forecasts, the year 2,000 will be that of the communications computer, that is, communication systems bringing together telecommunications, television and the computer.

[Question] Is it possible that the Ivory Coast in the year 2000 will have the benefit of a network equal in quality to those of the developed countries.

[Answer] If the policy now being implemented by the government is continued, the quality of our network will to begin with meet all of our requirements by the end of the century. For that very reason, it will have nothing to envy that of the networks of some developed countries.

[Question] At a time when the International Administrative Telecommunications Conference in Geneva is preparing to look into the problem of allocating frequencies, what is the Ivory Coast's position?

[Answer] While reserving my answer to that question for that highly significant conference, let it suffice to tell you that the Ivory Coast's proposals will mainly relate to finding an equitable world-wide across the board allocation of radio-electric frequencies and geostationary space for the benefit of all humanity with no discrimination regarding means.

[Question] How does the Ivory Coast envisage utilization of direct radiocommunication satellites?

Developments in the satellite sphere lead one as a first stage to envisage regional or continental networks of telecommunication satellites. The problem of direct communication satellites is not a technical communications problem. It is in the sphere of information and includes political problems of such significance that it will take a great deal more time before we see that possibility of disseminating information, especially for the large countries and then for the whole world.

[Question] Is there a joint view among the African countries on this subject?

[Answer] Where the African countries are concerned, I think that when the time comes, the Pan-African Press Agency will be able to look into that matter.

8094
CSO: 5500

USSR

IMPROVEMENTS IN TELEVISION BROADCASTING DISCUSSED

Moscow VESTNIK SVYAZI in Russian No 8, Aug 79 pp 2-3

/Article by V.P.Dudkin, chief of the Television Broadcasting Division of the USSR Ministry of Communications: "Constant Improvement in the Quality of Operation of Television Broadcasting Facilities"/

/Text/ Among the "Basic Trends in the Development of the National Economy of the USSR for 1976-1980" are the tasks of "ensuring further development of radio and television broadcasting, including color, as well as providing for more extensive use of artificial earth satellites, primarily for providing television broadcasting to the areas of Western and Eastern Siberia..." Great efforts are already underway in these areas. The main tasks in the area of television broadcasting for the immediate future include further growth in color-television coverage for the country's population, accelerated introduction of technical facilities for sending television programs to the most distant and inaccesible populated points in the country, development of multiple channels for color television, and further improvement in the quality of television broadcasting.

At the present time, television is watched by 83 percent of the population of the USSR, which includes two channels to approximately 50 percent of the population, and three or more channels to 15 percent. The television network includes approximately 410 high-power television (TV) stations with outputs of 5 to 50 kilowatts, among which more than 120 broadcast local programs. Nearly 2,100 low-power retransmitters operate in small populated areas. In practically all cities which receive central television programming, it is possible to receive it in color.

The ground network for transmitting television channels contains 100 thousand kilometers of radio relay lines (RRL). Thanks to a significant volume of work on the renovation of the RRL, the principal main lines comply with the GOST (All-Union State Standard) requirements completely.

Recently there has been a clear-cut tendency toward accelerated development of the broadcasting network and cessation in growth of program television stations. Moreover, the volume of timely television programming on location is growing and is being included in central and republic programming, and

the channels for program transmission are being lengthened greatly. All this requires continuous improvement in the exchange network for TV programming traffic. Included recently in the network have been the "space bridges," formed with the aid of stationary as well as mobile satellite communications stations of the "Mars" type. The network for the distribution of television programs includes broadcasting units with an output of 5 kilowatts of the type "Yakor'," "Igla," and "Zona-1," and those with an output of 50 kilowatts, the "Uragan" and "Len." During the last 2 years utilization has begun of the more effective broadcasting units, the "Zona-2."

In addition to the indicated types of units, which comprise the basis of the TV broadcasting network, obsolete transmitters are still in use, such as the TTR-5/1.5 (Standard Television Station), the TTR-15/7.5, the TU-331 (Repeater), and the MTR-2/1. This equipment is used in specific cities primarily for broadcasting the second and third channels. Retransmitters which operate in the low-power television retransmitter network include such types as the TRSA-56, TRSA-12/12, TRSO, RTsTA-70 (with an output of 100 watts), RPTN (with an output of one watt), and the TRSN (with an output of two watts).

It should be mentioned that the majority of technical equipment in use was developed without consideration for the requirements of high-quality transmission of color television signals. New equipment has only recently been developed, such as the transmitter ATRS-5/1, which is now beginning to be introduced, the "Zona-2," the television retransmitters RTsTA, as well as the RPDTA, the first models of which will be manufactured by industry and will meet the GOST requirements for color television.

In an effort to guarantee the necessary high-quality indicators specialists of the USSR Ministry of Communications have organized the modernization and renovation of the TV transmitting stations. Modernization of the "Yakor'" Stations is nearly totally complete. At the present time recommendations are being developed for modernizing the "Uragan" and "Igla" stations.

In order to raise the level of service for radio and television equipment, employees of the USSR Ministry of Communications regularly conduct both all-union and zonal technical seminars. For example, during the 1977-1979 period seminars were held in the cities of Oryel, Yerevan, Beleba in the Bashkir ASSR, and in Vologda, which dealt with the new television station "Zona-2." A seminar in Chelyabinsk was devoted to the problems of raising the quality and reliability of transmitting facilities. In Riga a seminar was conducted concerning automation and control of transmitting facilities. On a yearly basis up to 60 employees of operational enterprises take part in qualifications-improvement courses at communication institutes in the cities of Leningrad, Tashkent, Novosibirsk, and Kuybyshev.

All this has had a positive effect on the operations of the transmitting facilities of television broadcasting. The average length of technical interruptions at a high-powered RTS (Television relay station) (which in

1978 amounted to 0.46 minutes per 1,000 hours of operation, and in 1976 to 0.68 minutes) and the length of deviations from estabilished norms were reduced. For a number of years enterprises of many oblasts, ktays, and autonomous republics of the RSFSR (including the Altayskiy Kray, the Bryanskaya, Vladimirskaya, and Yaroslavskaya oblasts, the Udmurtskaya, Severo-Osetinskaya ASSR, and others) have been operating without technical interruptions caused by operational personnel.

In 1978 the length of technical interruptions was reduced significantly at many oblast and republic enterprises. For example, technical interruptions were completely eliminated in 1978 at the high-powered RTS in the Kurskaya and Kuybyshevskaya oblasts. In the Byelorussian SSR the length of technical interruptions was reduced from 0.4 minutes in 1977 to 0.03 minutes in 1978, and in the Litovskaya SSR from one minute to 0.02 minutes correspondingly. The television broadcasting stations in the Estonian SSR, Latvian SSR, and the Ukrainian SSR operate with minor technial interruptions.

Although reduction in interruptions has been observed, significant technical interruptions still were noticed in 1978 at the high-powered TV stations of the Pskovskaya and Omskaya oblasts, the Tarar ASSR, the Tuvin ASSR, and the Kirgiz SSR. The length of technical interruptions has increased somewhat at low-powered retransmitters, while deviations from established norms have decreased sharply. The completed analysis of the disruptions indicates that in a majority of cases they are the result of many causes, including serious deficiencies in matters concerning the organization of technical operations, particularly involving a lack of systematic preventive maintenance, deficiencies in labor discipline, and insufficient knowledge of the procedures for equipment operation. A large percentage of technical interruptions, particularly at television retransmitters, is made up of interruptions due to power supply disruption.

One of the significant causes of low-quality operations is also the fact that the overwhelming majority of equipment (71 percent) requires renovation, however, the USSR Ministry of Communications does not have available a sufficient volume of equipment for this purpose. As a matter of fact, at the enterprises of the USSR Ministry of the Communications Equipment Industry, production of the means necessary for the renovation, replacement, and supply of equipment in the required amounts still has not begun. This affects both the broadcasting equipment of various power outputs as well as the metering equipment with which the operational communications enterprises are very insufficiently supplied. The USSR Ministry of the Electronics Industry does not satisfy the needs of the communications workers for electric vacuum and semiconductor devices, particularly for high-power transmitting tubes.

In a number of regions of the country, particularly in the mountains (for example, in the Dagestan ASSR), channels for the transmission of television programs are insufficiently developed. In connection with this, it is necessary to establish retransmitters including the organization of second and even third retransmissions. This sharply reduces the quality of the television transmission. Moreover, it should be noted that for such

regions it is necessary to have TV retransmitters with various rated outputs of 1, 10, 100, and 1,000 watts. At the present time industry is producing retransmitters with outputs of only 1 and 100 watts. The development of retransmitters with an output of 10 watts has been delayed, and the question of retransmitters with an output of 1,000 watts still has not been decided.

The existing inventory of broadcasting facilities, with the exception of the RPTN type of TV retransmistters and the individually remodeled retransmitters TRSA and the RTsTA , requires continuous, highly qualified maintenance, which is difficult to provide under high mountain conditions and in the remote and northern regions of the country. This is why in a number of such regions individual television stations, particularly those of low power, operate poorly. To improve the quality of their operations, automated technical equipment for television broadcasting is being developed in enterprises of the USSR Ministry of the Communications Equipment Industry.

With the goal of sharply increasing the quality of television broadcasting, the USSR Ministry of Communications in cooperation with a number of industrial ministries and departments has undertaken a wide range of measures. For example, the introduction has begun of the new broadcasting facilities "ATRS-5/1", the "Zona-2," the TV retransmitters RPTDA, "Rutan," and new systems of radio relay lines of the "Kurs" type.

Ever more extensive utilization is being made of satellite means of communication. The "Orbit" stations, created at the end of the sixties, have made it possible, through the use of artificial earth satellites "Molniya" (and since 1975 "Raduga"), to transmit TV programs to the large, populated points in Siberia, the Far East, and the Extreme North. The satellite systems of TV broadcasting in connection with the developing network of ground lines will allow the entire country to receive Central Television programming.

The efforts of the operations enterprises of the Ministry of Communications of the USSR to thoroughly renovate the existing broadcasting network are directed toward a sharp increase in the quality of TV broadcasting. One of the paths in this renovation is the construction of television stations with an output of 25 to 50 kilowatts and with antennas located on towers up to 350 meters high. One such station replaces a previously operating and less powerful (usually five kilowatts) television station and several low-power retransmitters. Besides improving the quality, this replacement will make it possible to increase the number of programs broadcast simultaneously.

Such efforts are practically completed in the "Tul'skaya and Vladimirskaya oblasts. It is necessary to note that renovation of the receiving network is also required in these instances. This does not present a complication, but takes a long period of time. The planned increase in the number of other types of TV stations, the decimeter wave band, stations which emit signals with vertical polarization, and so on, will contribute to the further improvement in broadcasting quality.

Various correcting devices are being developed for the purpose of improving the characteristics of operating TV transmitters. For example, devices already developed include a unit for input stabilization and correction of the TV signal, correctors for the trunk lines, an assembly for automatic regulation of the TV signal level, as well as new meters. The "test line" method is widely used for controlling the television signal transmission.

In addition to the purely technical measures mentioned, organizational steps for raising TV transmission quality are also beginning to be taken. Among these steps is the formulation of new operating instructions for television equipment, which take into account the long, operating experience of "traditional" equipment and the advent of new devices for satellite TV broadcasting. Development is continuing of the optimal structure for the TV transmitting network and for frequency planning. The working indexes for evaluating television enterprises operations are being improved.

It should be noted that the advent of such TV broadcasting facilities as satellite systems requires thorough consideration of the problems involved in the creation of television programs. In particular, it is advisable for the Gosteleradio of the USSR (State Committee for Radiobroadcasting and Television) to consider the question of the creation of special programming for transmission over the satellite without tying it to zonal time. This would make it possible to position the ground stations of the system throughout the entire, enormous territory of the country, which is included in the zone of service of the indicated system, as well as to increase sharply the coverage of the population of Siberia with Central Television programming.

Only a combination of the efforts of all the scientific, engineering, and technical employees of the USSR Ministry of Communications, Gosteleradio of the USSR, and a number of industrial ministries will make it possible to fully sove the problems of perfecting television broadcasting as specified in "Basic Trends in the Development of the National Economy for 1976-1980."

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FRANCE

DECISIONS AWAITED ON TELECOM-1, TDF-1 SATELLITES

Paris AIR & COSMOS in French 1 Sep 79 pp 35, 40

[Article by Pierre Langereux: "Decisions Awaited on Telecom-1 and TDF-1 Satellites"]

[Text] Matra and Aerospatiale, France's two major aerospace firms, continue to vie strenuously with each other for the assignment as prime contractor for the new Telecom-1 national public and private communications satellite program.

Selection of the contractor was supposed to have been made in June. Later, the minister of industry announced it would be made in July. Since then, however, it has been postponed from week to week because of the requirement for additional information. There was an appreciable difference--reportedly on the order of 80 million francs--between the bids submitted by Matra (the lower bid) and Aerospatiale. But this advantage is not necessarily the deciding factor when viewed in the light of the overall services offered by each of the prime contractor candidates in their respective proposals.

The government wants awarding of the Telecom-1 contract to be studied under all of its aspects. In particular, it wants the contractor eventually selected to be the one who offers the best possible prospects of export markets for subsequent communications and data-transmission systems likely to be derived from Telecom-1.

The latter is likewise one of the arguments advanced, each in its own behalf, by the two competitors for this big contract, the estimated total cost of which is about 1.5 billion francs.

But Matra and Aerospatiale are also engaged in cutthroat competition with each other for this award as prime contractor because Telecom-1 is one of the only two new space programs approved by the government for the 1980's. The other is the civilian earth observation satellite, SPOT, construction of which will be shared by Matra and Aerospatiale. An economic interest group is to be formed shortly by CNES [National Center for Space Studies] and the General Telecommunications Directorate (DGT) for development and production of the Telecom-1 satellite.

Because French prime contractors also have misgivings about the government's willingness to initiate construction this year of a national direct broadcasting TV satellite, the TDF-1, they prefer to have a bird in the hand than two in the bush. Prime Minister Raymond Barre did, of course, confirm in June at the Paris Air Show that a direct broadcasting TV satellite is being studied jointly with our German partners. But in this case too, the decision is slow in coming. Yet Franco-German negotiations are said to be making progress. In fact, another meeting is scheduled for 2 October between the French and German ministers, Andre Giraud and Voker Hauff. There is still a possibility that Paris will make a decision on the TDF-1 before the end of the year.

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FRANCE

MATRA TO BUILD TELECOM-1 SATELLITE

Paris AIR & COSMOS in French 22 Sep 79 p 45

[Article by Albert Ducrocq]

[Text] MATRA [Mechanics, Aviation, and Traction Company (also Missiles Company)] has been chosen to build the Telecom 1 satellite, based on the technology developed for OTS [expansion unknown] and the European ECS [expansion unknown] satellites.

Completion of the design phase is scheduled for February 1980, and construction of the first Telecom 1 is expected to be completed in October 1981 for its placement in geostationary orbit by the Ariane rocket before the end of 1982. The satellite will then be in commercial operation in 1983, which is to be celebrated worldwide as the communications year (during which it is also expected to place the second Telecom 1 in orbit).

At launching, Telecom 1 will weigh 1,018 kg (444 kg of which are its apogee motor, and 120 kg its payload). In space, its two wings--each carrying three solar panels (capable of supplying 1 kw under favorable conditions)--will span 13.8 meters tip to tip.

This Telecom 1, France's first domestic satellite, will have two basic missions:

1) Primarily, with a capacity of 1,000 telephone channels, it will provide conventional communications facilities to relieve the national network during peak periods and link the mainland with overseas departments. Paris television programs will be beamed to the Antilles as well as Reunion. Its antennas will enable, on the one hand, a semiglobal coverage (France, Spain, the Atlantic, and Africa), and, on the other, a partial, narrowly beamed coverage of the Antilles-Guiana area, all within the 4 gHz band (that is, uplinks operating at 5.9-6.4 gHz and downlinks at 3.7-4.2 gHz).

For these services, a 30-meter antenna will be assigned to Telecom 1 on the mainland, and 12-meter antennas in the overseas departments.

2) But Telecom 1 will also have a data processing mission. It will offer intercompany links via 6 repeaters in the 12-14 gHz band, each with a 36 mHz bandwidth able to accommodate 25 megabauds--a total of 150 megabauds for this function of the satellite--that is, the ability, at maximum, to transmit the contents of 50 books in one second...

This volume of data may be handled in any form: telephony, telefacsimile, telewriting, telefilm, teleconference, computer program transference, results of computerized calculations, information extracted from a data bank. In other words, Telecom 1 will put a teleprocessing service in space, in accordance with the wish of whoever in the Directorate General of Telecommunications spurred the architects of this advanced project.

For this teleprocessing service, 3-meter antennas will be adequate to assure communications. There will be many of them: more than 100 antennas are being planned for the first phase.

The use of Telecom 1 is expected to produce significant economic consequences over the next decade: Company operations will undergo substantial change as it becomes possible for the various establishments of a company, no matter how widely dispersed, to work as if they were all together in one location. France should benefit directly from these gains.

In the beginning, the users of Telecom 1 will in effect be an autonomous national network. However, it will be possible to interconnect them later with other similar networks and to the worldwide network.

At MATRA, the Telecom 1 program is being developed under the direction of Jacques Susplugas--the telecommunications engineer and a qualified French astronaut--whose competence is well known to us.

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FRANCE

FURTHER DETAILS ON TELECOM-1 DEVELOPMENT

Paris AIR & COSMOS in French 22 Sep 79 pp 46,56

[Article by Pierre Langereux]

[Text] In the beginning, when the Telecom 1 project was presented by its promoters--the DGT [Directorate General of Telecommunications] and the CNES [National Center for Space Studies]--there was no doubt whatever about the choice: The officials in charge of the project and the minister of industry himself announced that the Telecom 1 satellites would be based on the European ECS [expansion unknown] telecommunications satellites that had been built by MESH [expansion unknown], the European industrial consortium, with the major participation of MATRA [Mechanics, Aviation, and Traction Company (also Missile Company)]. The intent was clearly to bypass competitive bidding--a justifiable decision at the time in view of the fact that AEROSPATIALE [National Industrial Aerospace Company] had been the successful bidder for the construction of the ESA's [expansion unknown] H-SAT experimental direct television broadcast satellite. However, the new European project will be nipped in the bud by the French-German decision to develop jointly their own operational satellites for direct television broadcasting: TV-SAT for Germany and TDF-1 for France. Since then, the other ESA member countries have decided to initiate another direct television broadcast satellite project: L-SLT. But the contract originally awarded to AEROSPATIALE is obviously dead.

Under these circumstances, AEROSPATIALE applied to the government for permission to bid on the Telecom 1 project, thus opening to question the award promised to MATRA. Since then, the two major national aerospace firms have engaged in a ruthless struggle for the Telecom contract.

Telecom 1, Precursor of the European Network

The stakes are, of course, high. On the domestic scale, Telecom 1 is an operation estimated at 1.2 to 2 billion francs all told (instead of the 1.5 billion francs estimate of 1 year ago) for the building of the network, of which the space segment represents a substantial part.

but the government and the industrialists are looking farther ahead. As the DGT puts it, "the French satellite system should certainly have a gravitational effect on our European partners. To compete with the comparable services to be offered shortly by the American SBS system, Europe will actually have to develop its own system. Telecom 1 could thus be the first link in a new European network of domestic satellites to be in operation by the second half of the 1980 decade." This position is extremely important, since, as explained by Yves Cannac, author of the report that advocated the realization of the national telecommunications and television satellite projects, "in deciding to build her own national telecommunications satellite system, France has positioned herself to be able to set her own standards and provisions of agreement, instead of having to submit to decisions taken abroad." Under these conditions, the standards and provisions for commercial use of Telecom 1 will, in fact, foreshadow those of the future European, and perhaps the worldwide, system.

It is further conceivable that this will place the French prime contractor in an extremely favorable position to compete with the American ones. This explains the interest being shown in the domestic project, which is destined to be the precursor of the European and possibly foreign systems. The prospective telecommunications satellite system market is indeed potentially substantial. Countries such as India, Indonesia, Colombia, and the Arab nations have already decided to have their own space telecommunications systems. Others such as Brazil, China, Australia and groups of countries (Andean, Asiatic and African) envision having their own satellites but have not yet taken a final decision.

Telecom 1 In Service by Mid-1983

The Telecom 1 domestic network is scheduled to enter service by mid-1983, if the satellite procurement contracts are, in fact, let at the beginning of 1980 as planned. The first satellite is scheduled for launching near the end of 1982 and the second in April 1983. The system will have two satellites in geostationary orbit, one of them as a standby, at a longitude between 7 and 10 degrees west. The third satellite (to be delivered by mid-1983) will remain in reserve on the ground. The life of Telecom 1 satellites in orbit is expected to be normally 7 years. These satellites, weighing 1 ton at launching--and 550 kg in geostationary orbit, of which 150 kg is payload--can be launched in tandem with another satellite using the European Ariane rocket from Kourou.

Telecom 1 will be a geostationary telecommunications satellite system directly accessible by independent [illegible]ions. It will serve two objects. It will, on the one hand, provide links with the DOM-TOM [Overseas Departments-Overseas Territories] to handle telecommunications traffic (telephone and television) between metropolitan France and its remote territories, thus furnishing a service that is already being provided via Intelsat satellites but that will be expanded. On the other hand, Telecom 1 will

also, for the first time, provide links between enterprises, thanks to its wideband and high-speed data transmission capabilities (at 11-14 gHz), that will make new teleprocessing services available to users: teleconference, video-communications, high-speed document telefacsimile, high-speed transfers of files between computers, inter-establishment telephone, telex and other services.

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FRANCE

TELSPACE NOW SECOND IN COMMUNICATIONS FIELD

Paris AIR & COSMOS in French 22 Sep 79 pp 46-48

[Article by Pierre Langereux]

[Text] The GIE [Economic Interest Group] TELSPACE [expansion unknown], formed in 1969 by the two French electrical and electromechanical giants Thomson-CSF and CGE (CIT-ALCATEL), has in 10 years become the world's second largest builder of earth stations for telecommunications satellites. As the largest European (and French) builder, TELSPACE is nipping at the heels of the world's number one builder, the Japanese firm Nippon Electric Company (NEC), which has sold more than 100 stations.

The French builder has now far outdistanced the world's third largest builder--the American firm ITT, which has built some 20 stations--as well other firms in the international market: STA (Italy), Marconi (Great Britain). Ford Aerospace (United States), Hughes Aircraft (United States), and others. This is an excellent example of a French industry's success in a highly competitive market with a product "Made in France!"

74 Stations

To date, TELSPACE has built 74 earth stations in France, in the DOM-TOM [Overseas Departments-Overseas Territories], and in 22 foreign countries. TELSPACE's "catalog" today covers every type of station used in space telecommunications, from the three major sophisticated and costly types to the small, simple and economic transportable ones.

Thus, the French builder has constructed 19 Intelsat Standard A stations with antenna diameters of 30 and 32.5 meters; 13 Intelsat Standard B and transportable stations with antenna diameters from 11.8 to 14.5 meters; 13 Intelsat stations with antenna diameters of 14.5 meters for the domestic Zairian network (REZATELSAT), 3 Intelsat tracking, telemetry and control [TT&C] stations with antenna diameters of 14.5 meters, and 14 "Symphonie" fixed (16.5 m antennas) and mobile (8.8 m and 4.8 m antennas) stations for telecommunications in the 4-6 gHz band. In addition, TELSPACE

has built 1 Intelsat Standard C control station for the future Intelsat-5 satellites; 1 Intelsat Standard C station with antenna diameter of 17.4 meters; and 9 OTS [expansion unknown] fixed (14.5) and mobile (3 m) stations for service in the new 11-14 gHz frequency band. Lastly, TELSPACE has also built an experimental station with antenna diameter of 9 meters for channeling and propagation tests in the future 10 to 35 gHz frequency bands. This wide range of activity is moreover continuing to expand to meet new markets like that of direct television broadcasting at 12 gHz, for which TELSPACE is now offering new equipments for common or individual reception of television broadcasts direct from the satellite by means of small antennas of only 0.6 to 1.5 meter diameters, which can be installed on building rooftops or in the garden.

Objective: 200 Million Francs of Orders for 1980

The competition in this market is going to become more and more intense, in that although only a very few builders compete for the large stations, there are at least a dozen competitors for the medium-sized ones and at least 100 for the very small antennas, some of whom are already very well established in this market, like the American ones: Scientific Atlanta, Andrew, California Microwave...

This is why Thomson-CSF and CIT ALCATEL have just reorganized TELSPACE, on the occasion of the renewal of the agreements on 31 May 1979 for 3 years, and have signed a special agreement to cooperate with the NEYRTEC (Alsthom-Atlantique group) company for the supply of the mechanical systems for large- and medium-diameter antennas. Its technico-marketing potential thus reinforced, the group's new management, headed by Jean Lailheugue, has set for itself ambitious expanded marketing goals: attainment of a level of 200 million francs a year of sales beginning in 1980. This would be the equivalent, for comparative purposes, of building at least one Intelsat Standard A and five Intelsat Standard B stations, as well as a goodly number of small-diameter household antennas. TELSPACE's sales reached a level of around 150 million francs last year and this.

New Stations

To attain this sales objective of 200 million francs in 1980, TELSPACE is planning to export more than ever. Half of its sales would come from new agreements: construction of Intelsat Standard A stations in Greece, Kuwait, and Colombia--and possibly also in Malta, Mexico, Brazil, Argentina, the Arab countries, India... Approximately one-fourth would come from expansions of existing station capacities: Thus, TELSPACE is going to convert 26 earth stations, between now and 1981, to work with the new Intelsat 5 satellites, representing sales of more than 100 million francs. The remaining fourth of TELSPACE'S sales would be provided by new small earth stations for the Intelsat international network, the Telecom 1 domestic network and the European ECS and MARECS networks.

There is also the market for 12 m diameter antennas, especially, for stations in the European ECS satellite telecommunications network having heavy telephone traffic. But the market study is still in progress, and there will in any case be several European manufacturers in the running. As regards the MARECS maritime satellite telecommunications network, there is only one control station in prospect, which the French PTT proposes to install in New Caledonia.

The Telecom 1 Network

The study of the Telecom 1 network is not yet completed, but it is already known that it will include a main Standard A station at 11-14 gHz (30 m antenna) on the mainland, and at least 3 Standard B (12-15 m antennas) in the DOM-TOM, as well as perhaps several stations in Africa for 4-6 gHz links. The principal Telecom 1 innovation, however, will be the 11-14 gHz intra-enterprise links, and the French PTT facilities plan calls for the satellite to be able to serve around 300 "industrial centers," aiming, that is, at the big users such as airlines, banks, automobile manufacturers, large industrial enterprises (Thomson-CSF, for example, has 140 manufacturing plants in France), and others. With small stations consisting of AMRT [expansion unknown] transmitting equipment and antennas 2 to 3 meters in diameter, the total cost of which would be in the order of 1.5 million francs, sales of Telecom 1 stations could total 450 million francs over a period of 5 years to equip 300 centers. This is not a very large market, especially if compared to that of the teleprocessing terminals that will be connected at these centers.

The New TELSPACE Management Team

A new management is now heading up the GIE TELSPACE formed 10 years ago by the Thomson-CSF and the CGE (CIT-ALCATEL) groups to manufacture and market telecommunications satellite earth stations.

Its new head is Jean Lailheugue, 45, former sales manager of Thomson-CSF's Microwave and Space Communications Equipment Division. He is assisted in the technical sphere by Eugene Oger, deputy director in charge of marketing and products, and in the commercial sphere by Jean-Claude Dubois, deputy director in charge of foreign and industry relations. Technical management is provided by Pierre Houzelot and sales management by Bertrand de Maupeou. Chief Engineer Jean Salomon continues as scientific adviser of the group. The new TELSPACE board members are Christian Loeffler, manager of Thomson-CSF's Microwave and Space Communications Equipment Division, and Francois Petit, general managing director of CIT-ALCATEL's Communications Department.

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FRANCE

INVENTORY OF TELSPACE GROUND STATIONS TO 1 SEPTEMBER 1979

Paris AIR & COSMOS in French 22 Sep 79 p 48

[Text] Inventory of TELSPACE Ground Stations
(to 1 September 1979)

Country	Site	Antenna Diameter	Placed in Service
Intelsat Standard A 4-6 gHz Fixed Stations			
France	Pleumeur-Boudou (PB2)	27.5 m	1969
	Pleumeur-Boudou (PB3)	30 m	1973
	Pleumeur-Boudou (PB4)	32.5 m	1976
	Bercenay-en-Othe (BY1)	32.5 m	1978
	Bercenay-en-Othe (BY2)	32.5 m	1979
Martinique	Trois-Ilets	26 m	1972
Madagascar	Arivonimamo	30 m	1972
Ivory Coast	Akakro 1	30 m	1972
	Akakro 2	-	-
Senegal	Gandoul	30 m	1972
Gabon	N'Koltang	30 m	1973
Cameroon	Zamengoe 1	30 m	1973
New Caledonia	Noumea	32.5 m	1976
Iraq	Dujail 1	32.5 m	1976
	Dujail 2	32.5 m	1976
Syria	Sednaya	32.5 m	1977

Country	Site	Antenna Diameter	Placed in Service
Intelsat Standard A 4-6 gHz Fixed Stations [cont'd]			
Congo	Mougouni	32.5	1978
Togo	Cacavelli	32.5	1978
French Guiana	Trou-Biran	32.5	1974
Intelsat Standard B 4-6 gHz Fixed Stations			
Reunion	Riviere-des-Pluies	14.5 m	1974
Mali	Bamako	11.8 m	1976
Tahiti	Papeete	11.8 m	1978
Chad	Goudji	14.5 m	1978
Djibouti	Djibouti	11.8 m	1979
New Hebrides	Port Vila	11.8 m	1979
Guinea	Wonkifong	14.5 m	1980
Intelsat Standard B 4-6 gHz Transportable Stations (present emplacement)			
Brazil	Natal	11.8 m	1977-1979
French Guiana	Trou-Biran	11.8 m	
France	Pleumeur-Boudou (No. 1) Pleumeur-Boudou (No. 2) ---- ----	11.8 m 11.8 m 11.8 m 11.8 m	1977-1979

Country	Site	Antenna Diameter	Placed in Service
Intelsat B 4-6 gHz Stations for REZATELSAT Network			
Zaire	Kinshasa (N'Sele)	14.5 m	
	Lubumbashi	14.5 m	
	Kisangani	14.5 m	
	G-Badolite	14.5 m	1978-1980
	Gemena	14.5 m	
	Bukavu	14.5 m	
	M'Bujimayi	14.5 m	
	Bandundu	14.5 m	
	M'Bandaka	14.5 m	
	Kamina	14.5 m	
	Kalemie	14.5 m	1978-1980
	Kindu	14.5 m	
	Isiro	14.5 m	
Intelsat 4-6 gHz Fixed Control Station			
Cameroon	Zamengoe 2	14.5 m	1975
	Zamengoe 3	14.5 m	1977
France	Pleumeur-Boudou	14.5 m	1979
"Symphonie" 4-6 gHz Fixed Stations			
France	Pleumeur-Boudou (master station)	16.5 m	1973
	Toulouse (master station)	--	--
"Symphonie" 4-6 gHz Transportable Stations (present emplacement)			
Ivory Coast	Akakro	8.8 m	
	Bouake	8.8 m	1975-1979
Gabon	Franceville	8.8 m	

Country	Site	Antenna Diameter	Placed in Service
"Symphonie" 4-6 gHz Transportable Stations (present emplacement) [cont'd]			
Iran	Teheran Shiraz	8.8 m 8.8 m	1975-1979
Egypt	Cairo	8.8 m	
Germany	Berlin	8.8 m	
St. Pierre-et-Miquelon	---	8.8 m	
France	Levallois Toulouse Pleumeur-Boudou	4.8 m 4.8 m 4.8 m	1975-1979
Switzerland	Geneva (Telecom 79)	4.8 m	
Intelsat 11-14 gHz Fixed Control Station			
France	Pleumeur-Boudou	--	1979
Intelsat Standard C 11-14 gHz Fixed Station			
France	Bercenay-en-Othe (BY3)	17.4 m	1980
"OTS" 11-14 gHz Fixed Station			
France	Bercenay-en-Othe	14.5 m	1977
"OTS" 11-14 gHz Transportable Stations (present emplacement)			
France	Limours Pleumeurs-Boudou	3 m 3 m	1979-1980

Country	Site	Antenna Diameter	Placed in Service
"OTS" 11-14 gHz Transportable Stations (present emplacement) [cont'd]			
France	Pleumeur-Boudou	3 m	1979-1980
	Geneva(Telecom 79)	3 m	
	Geneva(Telecom 79)	3 m	
	----	3 m	
	----	3 m	
Tunisia	Tunis	3 m	
Experimental 10-35 gHz Fixed Station			
France	Gometz-la-Ville	9 m	1973

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END